OBSERVATIONS ON FIRE-DAMAGED WHITE PINE IN SOUTHWESTERN MAINE JULY 1948

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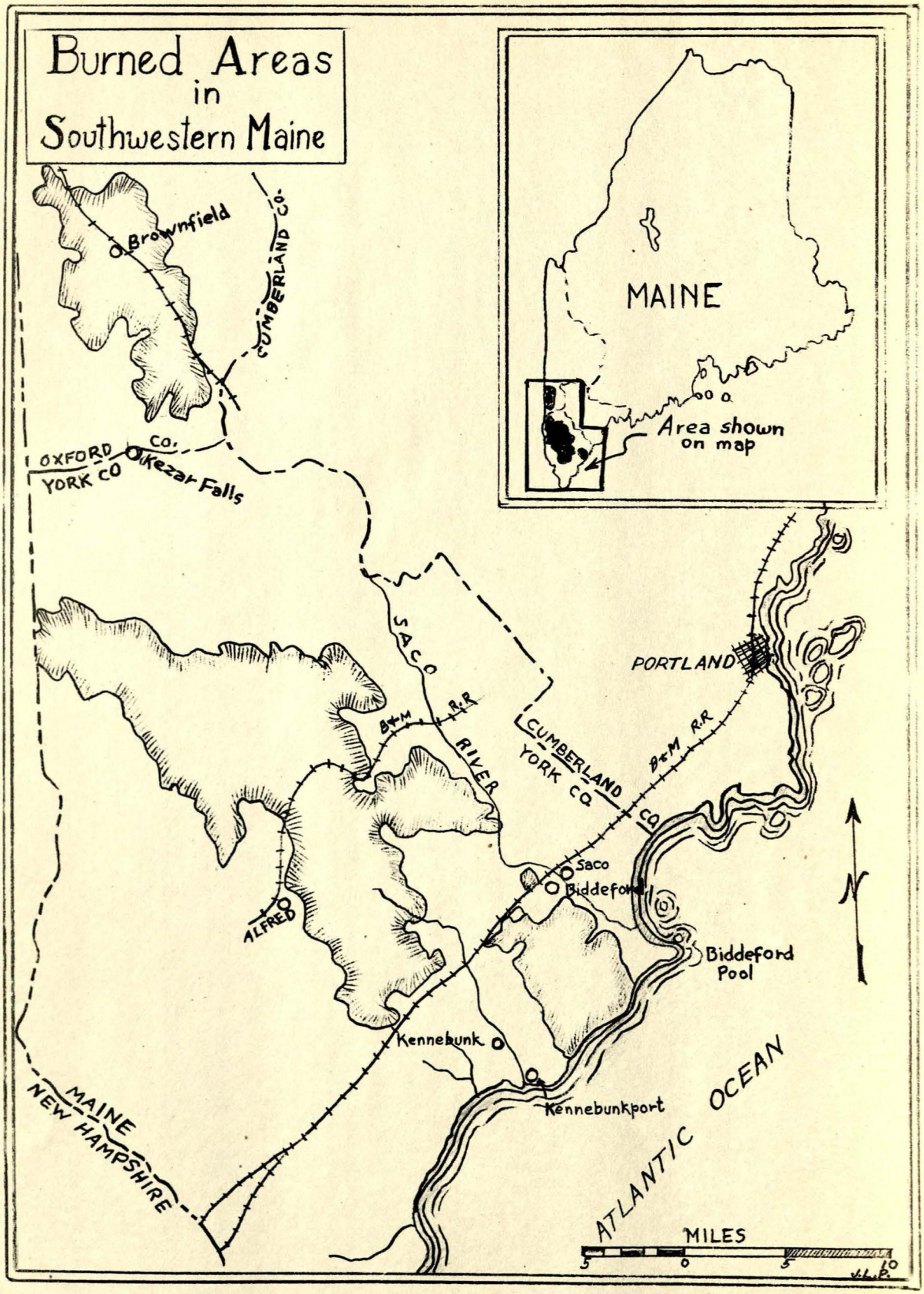
Burned Areas
in
Southwestern Maine
MAINE
Area shown
on map
Brownfield
CUMBERLAND CO.
OXFORD CO
YORK CO
Okezar Falls
SACO
RIVER
B&M RR
PORTLAND
CUMBERLAND
YORK CO
B&M RR
CO
Saco
Biddeford
ALFRED
Biddeford
Pool
Kennebunk
Kennebunkport
MAINE
NEW HAMPSHIRE
ATLANTIC OCEAN
MILES
5
0
5
10

Observations
On Fire-damaged White Pine
In Southwestern Maine
July 1948

by

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and

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In October 1947 forest fires over-ran about 130,000 acres of forest land in southwestern Maine. Some 48,000 acres of merchantable timber were included in the fire area. Three-quarters of the saw-timber volume was white pine.[3/]

Crown fires killed outright almost every tree on 4,000 acres of poles and saw timber.

The other 44,000 acres of merchantable timber were scorched by surface fires of varying intensity. Here most of the understory trees

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1/ Forest Commissioner, Maine Forest Service, Augusta, Me.
2/ In charge, White Pine Branch, Northeastern Forest Experiment Station, Alfred, Me.
3/ Northeastern Forest Experiment Station. Report on the survey of timber damage by forest fires in southwestern Maine, October 1947. 9 pp., illus. (processed). Philadelphia. 1948.

were killed. But apparently many of the larger trees escaped with only light damage to the upper roots and the lower portion of the stem. These observations apply to such partly burned stands.

Salvage operations began last winter. By late spring, some 120 million board feet of stumpage had been sold to sawmill operators.

Until the start of the 1948 growing season, it was generally believed that white pine mortality would be widespread during the spring and summer. It was feared that insect attacks would follow the fire and perhaps hasten mortality. It was expected that wood-boring insects would wipe out stumpage values of any timber not salvaged this year.

In early July, when these observations were made, signs of additional tree mortality were not conspicuous. Except in crown-fire areas, green crowns were still green; growth of new shoots was apparently normal. It begins to seem probable that insects will not be the problem the first year that they might be later when the population has a chance to build up. Stumpage owners are now asking whether immediate and complete salvage is still necessary. Woods operators are trying to decide which woodlots should be cut first and what timber is a good risk to leave standing for a year or two. Foresters are looking at such stands with an eye to their value as seed sources, and are weighing means of obtaining desirable natural reproduction consistent with eventual salvage.

Previous studies of fire-damaged white pine have indicated the

need for immediate removal of badly scorched trees.[4/] [5/] [6/] These studies point out that delayed mortality due to insects, disease, and site deterioration may remove a large proportion of the living trees left in burned areas. It seems that there is little knowledge of how to handle moderately burned white pine stands so as to insure a new crop before the source of seed is harvested.

Observations On Individual Trees

In the fire areas, crown destruction is the outstanding damage feature. All gradations of damage are represented. By July, many of the dead needles had fallen. Those that had not turned brown during the winter show no further discoloration. Unless killed by flames or heat, each bud seems to have opened. The new shoots display full coloring and seemingly normal growth.

At least in the southern part of the fire area, white pine cones had started to open several weeks before the fire. The fire itself forced the release of many seeds left in closed or partly closed cones. Hemlock seed (and some white pine seed from the upper, resinous portions

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4/ Stickel, Paul W. The effect of basal-wounding by fire on trees in the Northeast. Northeast. Forest Expt. Sta. Tech. Note 30. 2 pp. (processed). New Haven. 1940.

5/ ---------- Nature of fire damage to northeastern forests. Important tree pests of the Northeast, pp. 173-177. Mass. Forest and Park Assoc. 1940.

6/ Shepard, H. B. Fire damage in the northern forest region. Northeast. Forest Expt. Sta. Tech. Note 24. 2 pp. (processed). New Haven. 1936.

of the cone) was generally dropped after the fire.

Stem discoloration does not seem to be always a sure indication of damage in white pine. Discolored bark is observed to be tight and moist on some younger stems. Thick bark on the larger white pines, of course, forestalled to a large extent serious damage to the lower trunk from surface fire.

Root damage, though difficult to evaluate, seems to be closely correlated with the amount of litter, duff, and humus destroyed. The pre-fire level of the forest floor is plainly marked on many trees. Where the organic surface has been burned off so completely as to expose the mineral soil, there the heaviest scorching of root collars is to be found. The degree of damage to litter, duff, and humus may be mapped; and most areas may be classified with respect to this condition. Where the surface organic matter has been less than half burned off, it is obvious that the larger tree roots were scorched on top only. As much as two-thirds of the root surface is still intact and functioning.

Conditions Influencing Damage

Since the fires occurred in late October, the abundance of food stored in trees after the 1947 growing season may partially explain why many root-damaged trees were still living in July 1948.

The spring weather may also have been very important in delaying tree mortality. During April and June, rainfall was close to normal

for this general area. In May, however, just as growth was getting under way, rainfall at Portland, Me., totalled 4.34 inches above normal with 17 cloudy days and only 27 percent total sunshine. This was the cloudiest May in some 70 years.

At the time of the fire, the water table was extremely low in southwestern Maine. Following an unprecedented period of drought, almost all sites were very dry. As a result, the fire spread rapidly through swamps and low places, going deep into the accumulated organic debris and causing extensive root damage. Windthrow is now a serious problem on these swamp sites. The most heavily damaged stands, with respect to the site factor, are those occupying ledges and those situated in the dried-out swamps where roots were located in combustible organic matter.

As might be expected, heavy slash accounted for some of the hottest fires. Seed trees and all reproduction were generally killed on every slash area. But where slash had been on the ground more than 6 years and where the fire did not crown, young stands seem to have suffered less damage than those on more recently cut areas. One white pine stand was observed where a partial cut was made in 1943. Here the standing trees are considerably less injured than those in surrounding heavier cuttings. It may be that the smaller volume of slash left after partial cutting accounts for this.

In addition to slash, the brake ferns that often follow clear-cutting supply a highly inflammable fuel, which added to the fire

problem in many places.

Areas burned over one or more times prior to the 1947 fire show the most conspicuous site changes. Rocky ledges and ridge tops repeatedly burned have lost much of their topsoil.

Incoming Reproduction

Already apparent in July was the composition of the next tree crop on many parts of the burn. Where the fire was intense, only sprouts and seedlings of gray birch, red maple, and oak are to be found. Except along the edges of these areas, it seems unlikely that any new pine growth will be found for many years. Often, wherever the surface fire was moderate or light, a fair catch of pine or hemlock seedlings is observed. 1947 was a good seed year for both of these species. Since hemlock cones had not opened before the fire, hemlock seedlings are considerably more numerous than white pine seedlings.

The effects of salvage logging, high soil temperatures, and brush and weed competition remain to be seen. Young hardwoods, both sprouts and seedlings, are conspicuous on most areas where the crown canopy has been opened up by fire or logging. In many places only hardwoods are left after logging to provide a source of seed.

All indications point to a heavy influx of hardwood reproduction on these areas. It is still too early to say how well the conifers can compete. Unless some measures are taken to release the new growth of pine and hemlock, it seems doubtful that many areas of the burn will

show satisfactory restocking of these more valuable species. Hardwood sprouts and seedlings have such a head start that they will take over good pine sites unless weeding operations are undertaken. This succession may be commonly observed on many cut-over woodlots.

Stand Treatment Problems

It is possible to classify portions of the burn according to percentage of crowns killed as well as proportion of duff and humus destroyed. Where all of the crown canopy is dead, it is not necessary to classify the stand further. However, where more than 20 or 25 percent of the crown canopy is still green it is helpful to map the degree of damage to the forest floor. If 75 percent of the duff and humus have been consumed, for example, it generally follows that root damage has been heavy. With maps showing degree of burn, site (especially in relation to windthrow), and volume per acre, the owner or operator may approximate the degree of risk involved in setting up priorities for salvage operations.

In more lightly burned stands, it may often prove feasible to mark for removal only the poor-risk trees. The risk of leaving lightly damaged trees may be more than offset by the improved chances of speeding reproduction of pine by natural means. Wherever possible, groups of white pine seed trees should be kept on the area. This may not provide satisfactory stocking but it may be the only practical reforestation measure at the present time. Later, weeding, release cutting, and possibly interplanting will be needed in most places

where the seed-tree method is tried.

On cutting areas where white pine seed trees are left and where sprouts do not have a strong foothold, seed-bearing hardwoods can be cut or girdled in order to get rid of the source of the seed of weed trees. Dense stands of hardwood sprouts are already getting started on most of the exposed sites occupied by hardwoods before the fire. In mixed pine-hardwood stands, hardwoods have often been checked by cattle and sheep grazing. This method of weed-tree control might be helpful under present conditions.

Where the source of pine seed is inadequate, it may be necessary to seed or plant pine. In the first few years after logging, white pine can seldom be planted with any hope of success. This is because of the Pales weevil. Fresh cuttings attract large number of this insect. It kills young pine of planting size by feeding on the tender bark, girdling the trees.

Just how this insect threat is affected by widespread fire is not known. Last spring both red and white pine were planted on various burned sites in southwestern Maine. Recent inspections of plantations on burned logged areas show that the weevil is still present in spite of fire. Plantations on burns where no nearby logging has taken place, however, show no Pales weevil damage. It is still too early to determine the effect of the burn on this insect, or the amount of damage it might do to pine seedlings germinating this year.

Hand, machine, and airplane seeding are other methods of

regenerating pine that have been used with more or less success in other areas. Little is known of the feasibility of using these methods in southwestern Maine. Some methods are being tried out by the Maine Forest Service and at the Massabesic Experimental Forest. Results are not yet available.

Stumpage prices, in general, are holding to what they were before the fire.

It is encouraging to note that many of the lightly burned timber stands may survive, except for loss of seedlings and saplings. Continued observation and detailed research should suggest an adequate basis for harvest and regeneration of these stands.

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